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(54) **Lengthening or thickening human hair**

(57) Human hair is lengthened or thickened using a layer of hair filaments in which the filaments are arranged substantially parallel at least at one end of the layer and are bonded together at that end on at least one side by ribbon(s) of thermoplastic resin to form a plastics strip with a row of hair filaments attached thereto. The plastics strip of the layer is bonded by heat and pressure to live hair and the strip then cut or broken to provide separate tufts forming hair extensions. A process and apparatus for producing the hair layer and a tool for use in joining it to the live hair are also described.

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TREATED NATURAL OR ARTIFICIAL HAIR FOR USE  
IN LENGTHENING OR THICKENING HUMAN HAIR;  
AND METHODS, PROCESSES, APPARATUS AND  
TOOLS RELATING THERETO

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This invention relates to treated natural or artificial hair for use in lengthening or thickening human hair; and methods, processes, apparatus and tools relating thereto.

10 In GB-B-2 260 490 there is described and claimed a method of lengthening and thickening human hair which I invented and which comprises applying to the end of a tuft of hair of desired length, colour and thickness, a molten thermoplastic adhesive so that one  
15 end of all of the hairs in the tuft are wetted by the molten adhesive, causing or allowing the adhesive to harden so as to secure all the hairs of the tuft together, and thereafter heating the adhesive to a softened condition and, whilst in the softened  
20 condition, contacting the end of the tuft of hair containing the softened adhesive with hair on the scalp to which the tuft is to be attached and causing or allowing the adhesive to set so that the tuft is secured to the hair on the scalp.

25 The above method has proved to be very successful commercially in lengthening and thickening human hair and has proved to be superior in several respects to previous proposals for human hair lengthening and thickening. In particular, the important aspect of my  
30 afore-mentioned invention which resided in providing a two-step process wherein tufts of hair treated with adhesive can be prepared in advance of attachment to scalp hair gave several important advantages over methods previously proposed and used.

35 Nevertheless, I have realised that several significant improvements can be made in my above-

mentioned method in order to solve particular problems which can arise in its use.

A general problem with the method at present used is that a certain amount of training and manipulative skill is required for personnel using my method in hair salons and it is obviously desirable that the amount of training and skill required should be reduced as much as possible so as to make my method more readily available in hair salons which perhaps may not have staff who are sufficiently skilled to be able to undertake successfully the attachment of the treated tufts to scalp hair. Moreover, even with skilled staff there is a degree of variability in results due to the necessary manipulative finishing of the bonds. It is obviously desirable that the necessity for such manipulative skills be reduced or avoided.

It is desirable that the method and equipment used to perform hair extensions it should produce consistently good results and it will be apparent that the manipulation referred to above does inevitably tend to cause variability in the bonds of the hair extensions.

It is also desirable to devise some means of automation for the method because of the excessive time which tends to be required for each treated tuft of hair to be attached to the scalp hair by the method as described above. Additionally there is a need to provide lengths of treated extension hair in a convenient form.

My present invention firstly enables prepared lengths of extension hair to be made in a convenient form for use and secondly enables the use of an automatic tool for applying tufts of hair to human scalp hair.

According to a first aspect of the present

invention there is provided treated natural or artificial hair for use in lengthening or thickening human hair, in the form of a layer of hair filaments in which the filaments are arranged substantially parallel at at least one end of the layer and the said  
5 end of the layer of hair filaments is bonded together on at least one side by a ribbon or ribbons of thermoplastic resin to form a plastic strip with a row of hair filaments attached thereto.

10 Preferably the said strip is indented at intervals to provide recesses to facilitate bonding with human scalp hair by providing for the plastic to partially surround the scalp hair before bonding.

The strip may additionally be fashioned, for  
15 example with regular ridges and/or depressions, to facilitate its cooperation mechanically with a tool for applying a series of individual tufts of extension hair to human scalp hair from said strip of hair filaments. For example the ridges or depressions may  
20 be on the top or the side of the strip and may be adapted to cooperate with one or more driven cogwheels which urge the strip forward to a position where an individual tuft or tufts of hair with adhesive is to be applied to scalp hair. Optionally the strip may  
25 additionally carry identification markings, for example concerning the length or shade of hair colour, or any other desired descriptive material, e.g. trade marking.

Optionally, also, the strip may be scored or  
30 otherwise weakened at intervals (between said recesses if recesses are provided) to facilitate separation of individual treated tufts of hair for use as hair extensions.

It may also be arranged for the recessing and/or  
35 other fashioning of the plastics strip to facilitate the packaging together of a plurality of said strips.

The present invention also provides a batchwise or continuous process for producing a strip of treated hair as described above which process comprises:

arranging a layer of natural or artificial hair  
5 filaments so that at at least one end of the layer the filaments of hair are substantially parallel to one another;

bringing into contact with one or both sides of said end of the layer a ribbon or ribbons of  
10 thermoplastic resin;

applying pressure and heat to bond the ribbon or ribbons to the hair, for example by means of heat rollers to compress the ribbon or ribbons together with the hair;

15 cooling to set the resin;

and optionally thereafter cutting the layer into convenient lengths so as to form plastic adhesive strips from which the extension hair filaments project.

Simultaneously with or after the ribbon or  
20 ribbons have been bonded to the hair, indentations are preferably applied to the resulting strip at intervals to provide recesses in the strip to facilitate bonding to human scalp hair.

Also provided by the present invention is an  
25 apparatus for performing the above process which comprises means for arranging a layer of natural or artificial hair filaments so that one end of each filament is parallel to the next;

means for supplying and applying a ribbon or two  
30 ribbons of thermoplastic resin to one side or both sides of the said ends of the hair filaments and for bonding said resin to said filaments to form a strip of thermoplastic to which said filaments are attached.

The apparatus preferably comprises means for  
35 applying indentations at intervals in said plastics strip. Further, the apparatus also preferably

comprises cutting means to cut into convenient lengths the resulting plastic strip having extension hair filaments projecting therefrom.

According to another aspect of the present invention there is provided a method of lengthening and thickening human hair which method comprises positioning the strip of treated natural or artificial hair filaments of the invention adjacent a human scalp hair filament which is to be extended and applying heat and pressure to bond the strip to the scalp hair, and either before or after said positioning step, cutting or otherwise breaking the plastics strip so as to separate a tuft of said filaments to form the hair extension for said scalp hair filament. The plastic strip preferably has a series of indentations and one of said indentations is positioned at least partly to surround said scalp hair filament before the bonding step. More preferably two of said plastic strips are positioned with indentations opposite to one another and surrounding the scalp hair filament before bonding the strips to the scalp hair. When two strips are used the hair attached to each strip may be of different colours so as to produce, for example, more closely the appearance of natural hair which tends to be of variable colour. It is also, or course, possible to use different coloured hair in the same strip, if desired.

The present invention also provides a tool for use in lengthening and thickening human hair which tool comprises means for holding one or two strips covering extension hair as described above, means for positioning the strip or strips adjacent to the human hair filament to be extended, means for applying squeezing pressure to bond the plastic of the strip or strips to the human hair filament to be extended, and means for cutting the strip or strips to separate

individual tufts of extension hair from each strip.  
Preferably the tool is adapted to position two strips  
having opposed recess portions about a scalp hair  
filament and to compress the said portions to said  
5 scalp hair filament to bond the whole together.

As will be seen from the above, in the present  
invention the hair which is to form the hair  
extensions is firstly arranged substantially flat with  
one end of each fibre being substantially parallel  
10 with the corresponding ends of the other fibres. The  
adhesive which is preferably in the form of two  
ribbons is then applied to each side of the end of the  
flat arrangement of hairs. The adhesive, which in a  
preferred embodiment is an extruded thermoplastic  
15 adhesive, can be supplied from a reel to each side of  
the arrangement of hair fibres and compressed into  
contact with each side of the ends of the fibres e.g.  
by an arrangement of rolls or continuous belts, and  
heated, for example by hot air, so that each ribbon of  
20 adhesive is bonded into the flat end of the extension  
hair arrangement so that all of the hairs are held by  
the combination of two ribbons at one end of each  
hair. The strip which forms the bonded end of the  
parallel hair arrangement is then cooled and the  
25 combined strip is cut into convenient lengths, for  
example of about two feet. Either before or after  
cutting, the strip is subjected to a cold embossing  
process whereby a regular series of indentations are  
made in the strip e.g. by embossing rolls.  
30 Simultaneously, optionally, the strip may be provided  
with separate indexing to facilitate mechanical  
cooperation and also with identifying markings, also  
by indentation or otherwise. In the above manner a  
magazine of extension hair has in effect been produced  
35 which can be used in a suitable tool for applying  
extension hair to scalp hair of a person whose hair is

to be extended. Alternatively the strip may be used by breaking or otherwise separating individual tufts of hair of suitable size from the strip for individual application.

5       The tool which is used for applying the extension hair to the scalp hair may bear resemblance to the well known "Dymo" (Trade Mark) type of tool for producing embossed tape. However the tool in accord with the present invention preferably comprises means  
10 for holding two of the strip-hair embossed composites in such a manner that at one end of each strip an embossed recess of one strip is held close to and opposite a corresponding embossed recess on the other strip and the tool is then operated so that the two  
15 recessed portions of the tapes are brought together around a scalp hair and heat and pressure are applied to bond the two strips of adhesive with attached extension hair about the scalp hair and thereafter the two strips are cut so as to leave a combined tuft of  
20 extension hair attached to the scalp hair, adjacent recessed portions of the two strips then being brought forward in the tool ready for attachment to the next scalp hair to be extended.

It will be seen therefore that the above  
25 described tool enables extension hair to be attached to scalp hair both uniformly and at short intervals of time thus greatly increasing the speed of the hair extension process. It will be seen also that these advantages are brought about firstly by means of the  
30 particular type of compact package or "magazine" of treated extension hair and also the design of the tool in which the novel magazine is employed. As will be readily seen, a number of variations and modifications of the above described developments are possible  
35 without departing from the general scope of the ideas described.

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CLAIMS

1. Treated natural or synthetic hair for use in lengthening or thickening human hair, in the form of a layer of hair filaments in which the filaments are arranged substantially parallel at at least one end of the layer and the said end of the layer of hair filaments in bonded together on at least one side by a ribbon or ribbons of thermoplastic resin to form a plastics strip with a row of hair filaments attached thereto.

2. Treated natural or artificial hair as claimed in claim 1 wherein said strip is indented at intervals to provide recesses to facilitate bonding with human scalp hair by providing for the plastic to partially surround the scalp hair before bonding.

3. Treated natural or synthetic hair as claimed in claim 1 or claim 2 wherein said strip is scored or otherwise weakened at intervals (between said recesses if recesses are provided) to facilitate separation of individual treated tufts of hair for use as hair extensions.

4. Treated natural or artificial hair as claimed in any one of the preceding claims wherein the said strip is additionally fashioned, for example with regular ridges and/or depressions, to facilitate its cooperation with a tool for applying a series of individual tufts of extension hair to human scalp hair from said strip of hair filaments.

5. Treated natural or artificial hair as claimed in any one of the preceding claims wherein said strip additionally carries identification

markings, for example concerning the length or shade of hair colour.

5       6.   Treated natural or artificial hair as claimed in any one of the preceding claims wherein the recessing and/or other fashioning of the plastics strip facilitates the packaging together of a plurality of said strips.

10       7.   A batchwise or continuous process for producing a strip of treated hair as claimed in any one of claims 1 to 6 which process comprises:

15       arranging a layer of natural or artificial hair filaments so that at at least one end of the layer the filaments of hair are substantially parallel to one another;

bringing into contact with one or both sides of said end of the layer a ribbon or ribbons of thermoplastic resin;

20       applying pressure and heat to bond the ribbon or ribbons of thermoplastic resin to the hair; cooling to set the resin;

25       and optionally thereafter cutting the layer into convenient lengths so as to form plastic adhesive strips from which the extension hair filaments project.

30       8.   A process as claimed in claim 7 wherein simultaneously with or after the ribbon or ribbons have been bonded to the hair indentations are applied to the resulting strip at intervals to provide recesses in the plastic strip to facilitate bonding to human scalp hair.

35       9.   An apparatus for performing the process as claimed in claim 7 or claim 8 which comprises: means for arranging a layer of natural or

artificial hair filaments so that one end of each filament is parallel to the next;

means for supplying and applying a ribbon or two ribbons of thermoplastic resin to one side or both  
5 sides of the said ends of the hair filaments and for bonding said resin to said filaments to form a strip of thermoplastic to which said filaments are attached.

10 10. Apparatus as claimed in claim 9 further comprising means for applying indentations at intervals in said plastics strip.

15 11. Apparatus as claimed in claim 9 or claim 10 further comprising cutting means to cut into convenient lengths the resulting plastics strip having extension hair filaments projecting therefrom.

20 12. A method of lengthening and thickening human hair which method comprises positioning the strip of treated natural or artificial hair filaments of any one of claims 1 to 6 adjacent a human scalp hair filament which is to be extended and applying heat and pressure to bond the strip to the scalp hair, and  
25 either before or after said positioning step, cutting or otherwise breaking the plastics strip so as to separate a tuft of said filaments to form the hair extension for said scalp hair filament.

30 13. A method as claimed in claim 12 wherein said plastics strip has a series of indentations and wherein one of said indentations is positioned at least partly to surround said scalp hair filament before the bonding step.

35 14. A method as claimed in claim 13 wherein two of said plastic strips are positioned with

indentations opposite to one another and surrounding the said scalp hair filament before bonding the strips to the scalp hair.

5           15. A tool for use in lengthening and thickening human hair which tool comprises means for holding one or two strips according to any one of claims 1 to 6, means for positioning the strip or strips adjacent to the human hair filament to be extended, means for  
10 applying squeezing pressure to bond the plastic of the strip or strips to the human hair filament to be extended, and means for cutting the strip or strips to separate individual tufts of extension hair from each strip.

15           16. A tool as claimed in claim 15 which is adapted to position strips having opposed recessed portions about a scalp hair filament and to compress the said portions to said scalp hair filament.

20           17. Treated natural or artificial hair; a batchwise or continuous process; apparatus; methods or tools as claimed in any one of the preceding claims substantially as hereinbefore described.

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